

The Difficulty of Accurate Planning: A Study of Portland's Light Rail Transit System

Richard Burnam-Fink
ENVS 400
Spring, 2012

Abstract

A successful public transit system is vital to environmentally sound, livable cities, but planning such a system is extremely difficult. Portland's MAX system is heralded as a success story, but its planning process was originally inaccurate. These inaccuracies were caused by a combination of the newness of the technology and political pressure.

While estimates have become more accurate, the estimates of Portland's planners are not more accurate than planners elsewhere. Implementing different, possibly better public transit systems over-top an existing network is much more difficult, making the initial planning inaccuracies an issue in city planning.



A Portland MAX Light Rail Train

Background

- Urban sprawl and increased auto use high infrastructure costs, social segregation, and excessive use of land, oil, and other resources. In 2011 average delay from congestion was 34 hours per commuter, costing \$100 billion dollars.
- A successful public transit system could solve many of these issues, but transit planners are inaccurate : 72% of rail & 25% of road project demand forecasts had inaccuracies larger than $\pm 40\%$. Inaccurate estimates lead to inefficient transit systems (Flyvbjerg, 2005).
- Inaccuracies in estimates could be caused by a variety of factors : modeling failure, unexpected economic or technological developments, or even political pressure to make transit projects more appealing to construct.
- Portland is known for its innovative Light Rail Transit system, but only around 10% of its population commutes by public transit, compared to 20% in Baltimore, 30% in Boston, & over 50% in NYC.

Selected Sources

- O'Sullivan, Arthur. 2009. *Urban Economics*. 7th ed. Boston: McGraw-Hill.
- Flyvbjerg, Bent. 2005. "How (In)accurate Are Demand Forecasts in Public Works Projects? The Case of Transportation." *Journal of the American Planning Association* 71 (2)
- Vuchic, Vukan. 1999. *Transportation for Livable Cities*. New Brunswick, N.J.: Center for Urban Policy Research.
- Thompson, G.L. 2006. "How Portland's Power Brokers Accommodated the Anti-Highway Movement of the Early 1970s: The Decision to Build Light Rail"
- Pieger et al. 2009. "How Does Urban Public Transport Change Cities? Correlations Between Past and Present Transport and Urban Planning Policies." *Urban Studies* 46 (7) (June 1): 1421 -1437.

Research Questions

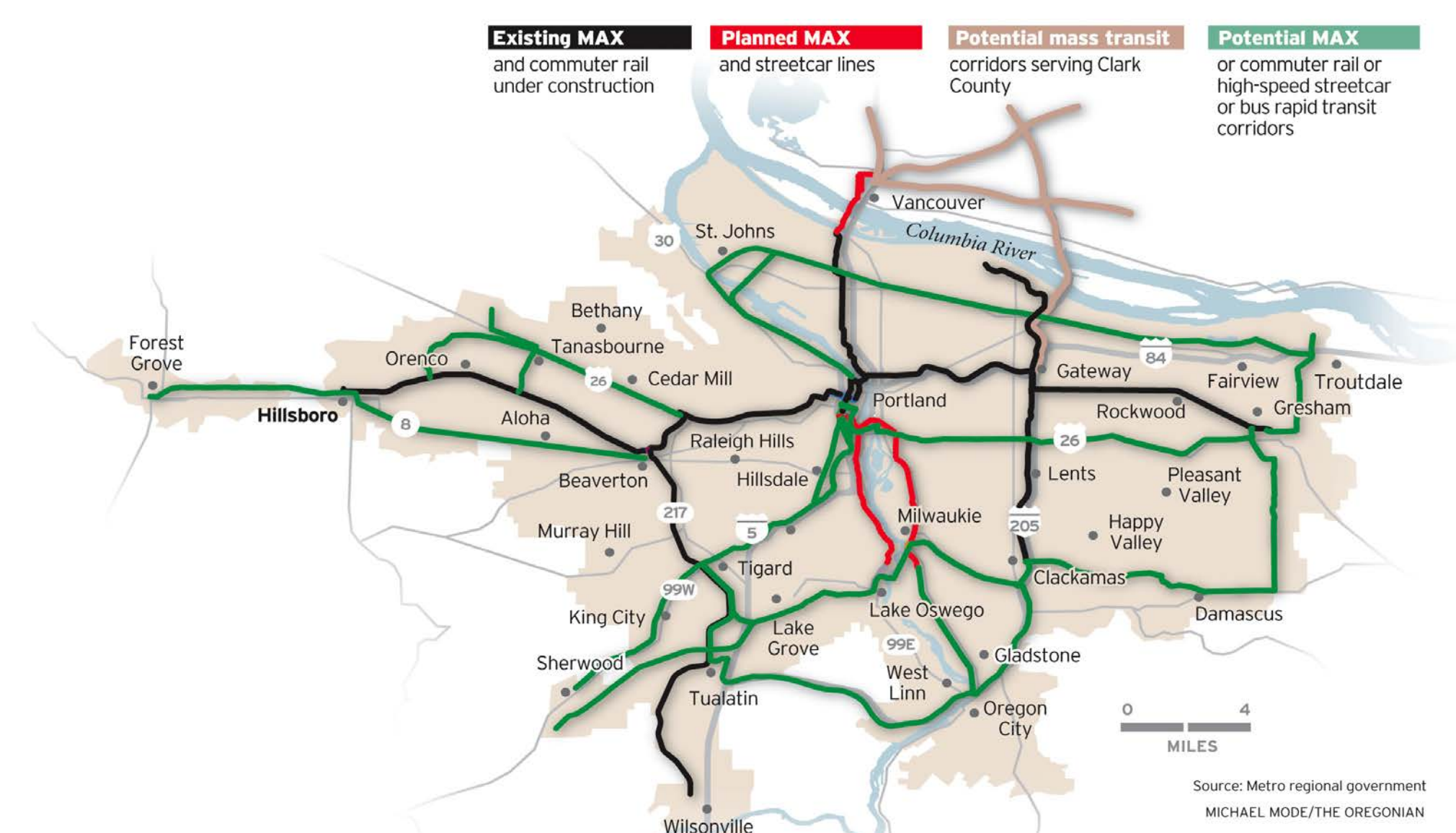
- How accurate are the estimates used to plan the Original Portland Banfield MAX line; how has the planning process & estimates changed over the last 30 years?
- Are there trends in the accuracy of those estimates which could be caused by outside forces, such as political necessity?
- Are Portland's planners more or less accurate than other cities' planners?

Methodology

- Compare estimates made about the Banfield project in 1980 with actual results from 1990.
- Examine planning documents from the 2010 Portland-Milwaukee project to find changes in planning process.
- Examine accuracy of similar projects in other cities to see if Portland's transit system is so acclaimed because it was more accurately planned.

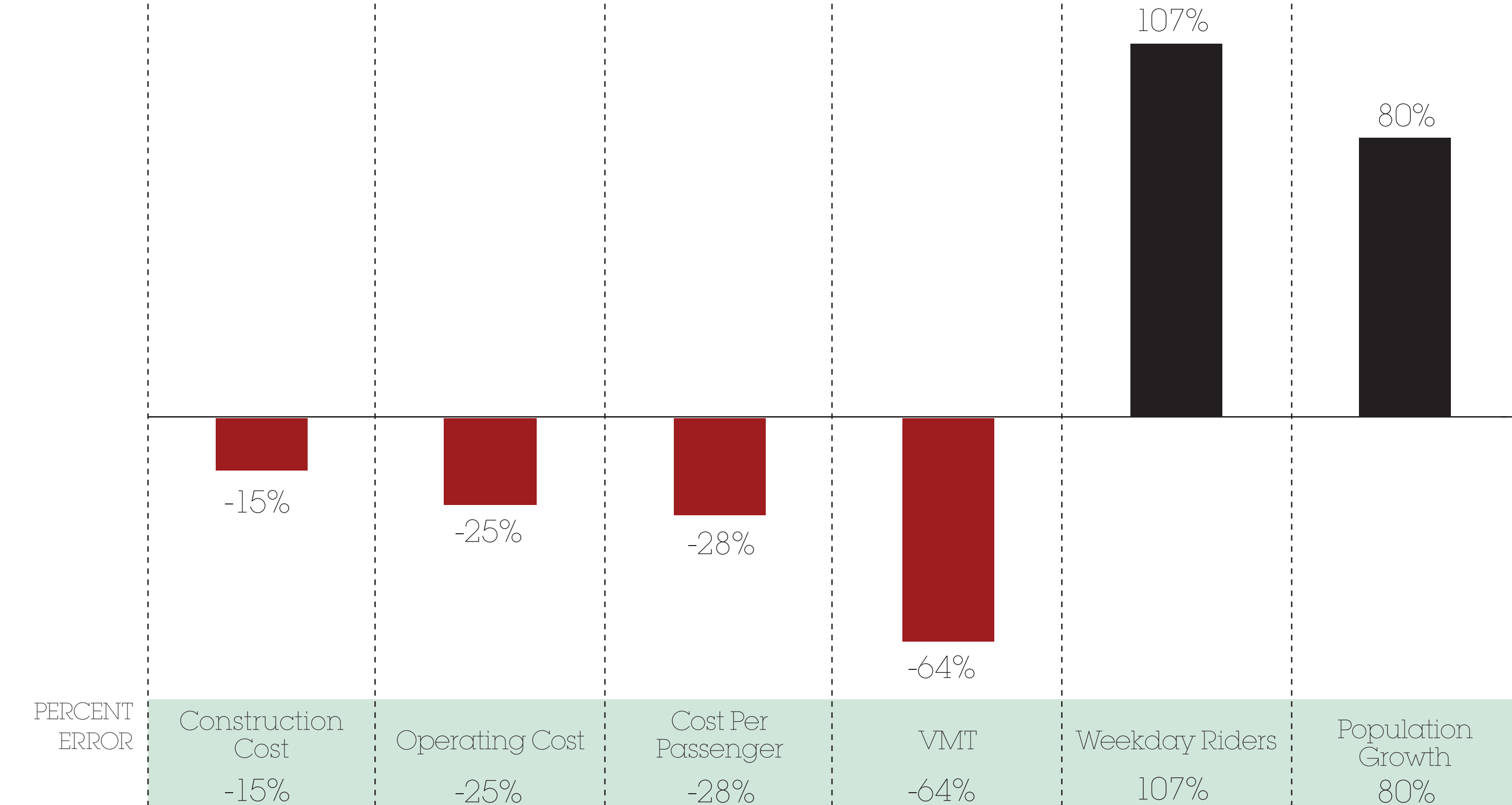
Results

- The 1980 estimates were far from accurate : costs projections were on average 22% lower than actual costs, while ridership projections were 107% higher.
- The 2010 estimation techniques were similar, but extra care was being taken in areas which were most inaccurate from 1980.
 - The original project had to overcome political pressure & be built quickly, while later lines were enured to be built to maintain system-wide consistency.
- Newer lines have had more accurate estimates than the 1980 project, but not more accurate than other cities' Light Rail Transit projects.

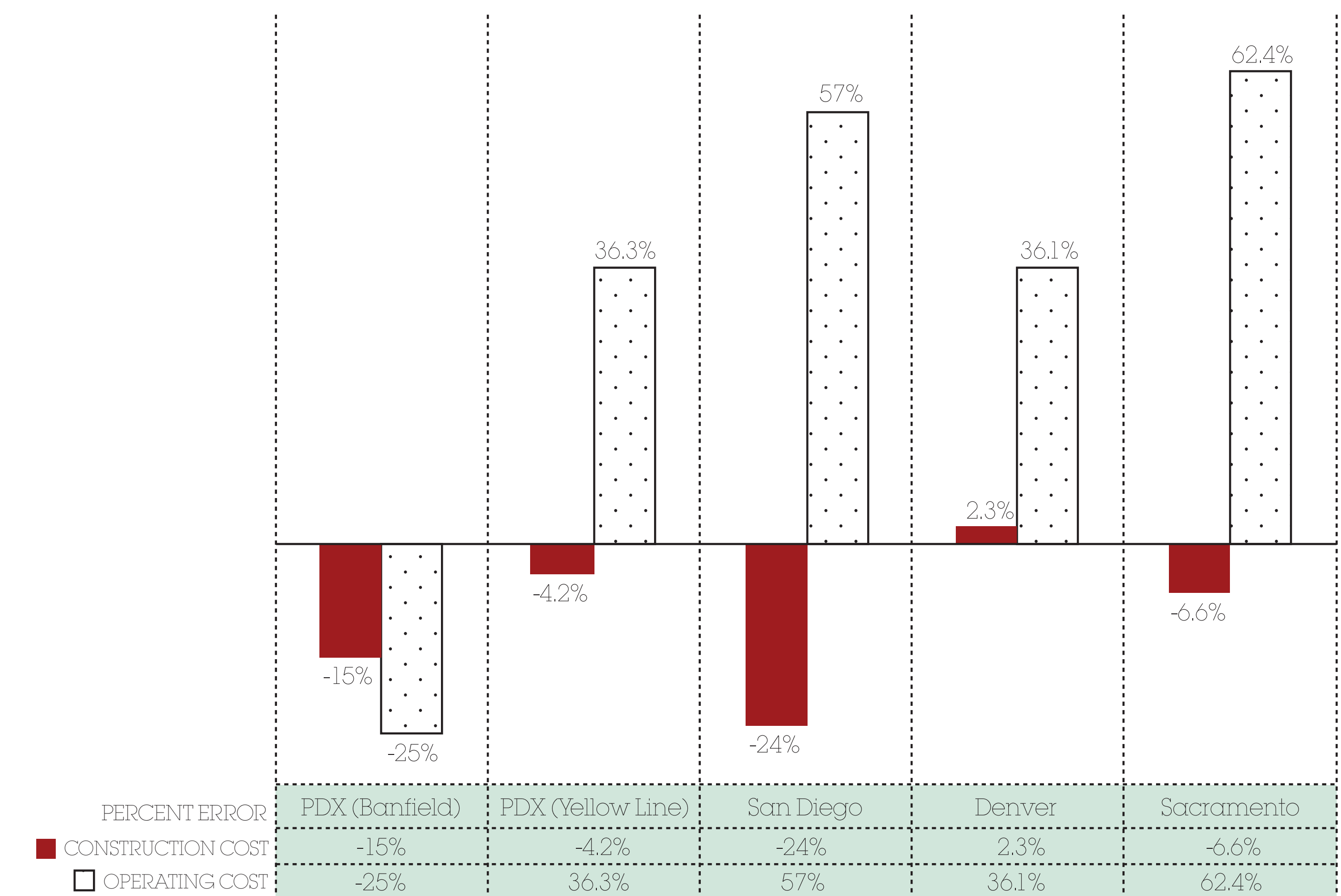


Portland's 2030 Transit Plan

PDX Planning Accuracy: 1980 vs 1990



Portland vs. America



These two charts show the percent error between the estimate and actual value. A negative percent error means the estimation was lower than the actual value, a positive percent error means the estimation was higher.

Conclusions

While the improvement of planning accuracy in Light Rail Transit projects is promising, the initial inaccuracies (political or otherwise) may cause cities to build transit systems which don't fit the area's needs, & are more expensive than other options.

Path dependency makes it harder to adopt new transit options. But if its hard to estimate the costs of implementing new technologies, as well as larger economic & population trends, how can planners make the best decision possible?

A possible solution is Scenario Planning, where planners accommodate multiple futures within their designs, ensuring success across varied conditions. It won't solve every issue, but it would be an improvement.